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NOTES ON NORTH AMERICAN SPECIES OF *RICCIA**

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(with plate iii)

RICCIA BEYRICHIANA Hampe and *RICCIA LESCURIANA* Austin

Riccia Beyrichiana I have discussed briefly on two former occasions,¹ but will here review some of the main points in its history, even at the risk of repeating some of the things that have elsewhere been said about it. The species was originally described in Lehmann's "Pugillus Septimus", published in Hamburg in 1838. The name was attributed to "Hampe Ms". It is probable, however, that the description was written by Lindenberg, whose classical monograph of the Ricciaceae had been published two years earlier, though Lindenberg's name appears only in the preface to Lehmann's work. The plant is said to have been collected in North America, between Jefferson and Gainesville, by a German botanical traveler, Beyrich. From what is known of Beyrich's travels it is evident that the Jefferson and Gainesville in question are in northern Georgia, where towns bearing these names are county seats about twenty miles apart. Until recent years *Riccia Beyrichiana* remained apparently unknown except from the original description. In some critical notes on the American species of *Riccia*, published by Professor Underwood in *The Botanical Gazette* in 1894, *Riccia Beyrichiana* was omitted on the ground that there was no recent evidence that it was a member of our flora. In 1898, however, Stephani, in his *Species Hepaticarum*² stated that he had seen Beyrich's plant, that it was collected in Jefferson, North America, and that it is doubtless a good species. And he gives a new description of it. Three years later, in 1901, I wrote to the Naturhistorisches Hofmuseum in Vienna, where the Lindenberg herbarium is preserved, and secured for study the pocket containing the apparent type of the species. I then published some notes on it, expressing the opinion that the species was a valid one and adding to the previous descriptions a more detailed account of the spores. Three years ago, after the meeting of the American Association for the Advancement of Science and the Botanical Society of America at Atlanta, Georgia, I took advantage of the opportunity to visit Jefferson and Gainesville and some of the intervening territory, with the hope and purpose of rediscover-

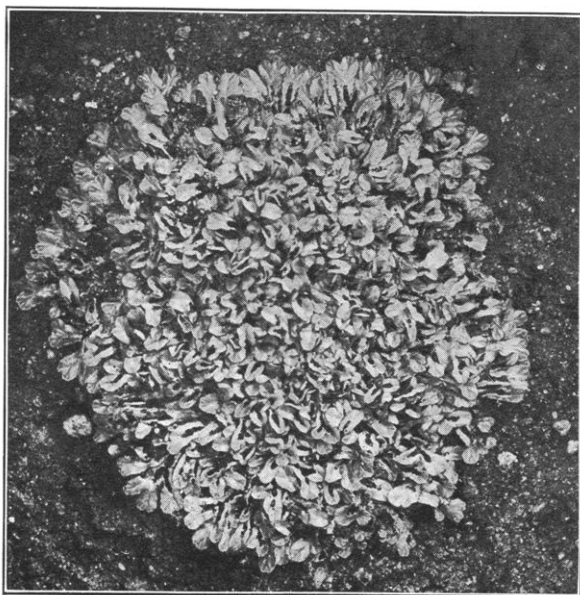
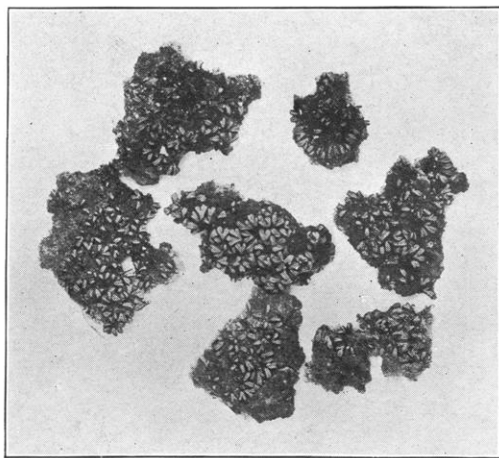
¹ Bull. Torrey Club 28: 161-165. 1901.

Jour. N. Y. Bot. Gard. 15: 60-63. 1914.

² Bull. Herb. Boiss. 6: 318.

* Abstracted and revised from an illustrated paper presented under a slightly different title before the Sullivant Moss Society at its New York meeting, December 29, 1916.

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EXPLANATION OF PLATE III

1. *Riccia violacea* M. A. Howe. Photograph, natural size, of specimens collected on Cayo Muertos, Porto Rico, March 9-12, 1915, by Britton, Cowell and Brown (no. 5089). The specimens, still living, though dried for about ten weeks, were soaked out and photographed on May 20, 1915.

2. *Riccia McAllisteri* M. A. Howe. Photograph, natural size, taken in October, 1914, of type specimens grown at The New York Botanical Garden; original from Granite Mt. (about 70 miles northwest of Austin), Texas, collected by F. McAllister (no. 3) in May, 1914.

ing this long-lost species. I did not find it at just those points, but at Athens, Georgia, in the same general region, I did find what I took to be it and so announced the rediscovery of the species. Since that time, however, I have felt that there were difficulties in the way of distinguishing the Georgian *Riccia Beyrichiana* from *R. Lescuriana*, which was described from New Jersey in 1869 and has since been reported from as far south as Florida, as far west as California, and has been alleged to occur in Europe also.

At the time of examining the original material of *Riccia Beyrichiana*, the thallus seemed to me so much smaller than that of *R. Lescuriana* as I then knew it, while the spores were so much larger and so much more opaque, that it hardly occurred to me that the two were closely related. Stephani, in his somewhat artificial arrangement of the species in his *Species Hepaticarum*, had placed them fifteen numbers apart. He had, by the way, described the thallus-margins of *R. Lescuriana* (name modified to "*Lesquereuxii*") as naked, although Austin's original diagnosis had stated that they were ciliate, and, on the other hand, he had attributed cilia to the thallus-margins of *R. Beyrichiana*, even though the original description of this species had implied that they were naked. The facts are that the original specimen of *Riccia Beyrichiana* shows a few inconspicuous cilia and authentic specimens of *R. Lescuriana* show more obvious ones. A study of a considerable series of living American specimens referred to *R. Lescuriana* indicates that the thallus-margins normally and usually show a few cilia, but that, as in most ciliate-margined species, the cilia are occasionally wanting or deciduous or are so few and small as to be easily overlooked. In the matter of the size of the thallus it is to be noted that, although the type of *Riccia Beyrichiana* seemed to me a much smaller plant than *R. Lescuriana*, Stephani, who also saw authentic material of *R. Beyrichiana*, makes it out to have at least a longer thallus (max. 10 mm. vs. max. 7 mm.) than does *R. Lescuriana*. In the matter of the size of the spores, one sometimes finds in *Riccia* a good deal of variation in the spores from a single capsule and in spores from different capsules on a single plant. And in this matter of size of spores, specimens of undoubted *Riccia Lescuriana* from Florida and California make a close approach to the type of *R. Beyrichiana* from Georgia. And the same may be said in regard to the opacity of the older spores. More constant and reliable than the size of the spores as a specific character are their surface markings, and in this respect the spores of the type of *R. Beyrichiana* are essentially like those of authentic specimens of *R. Lescuriana*, that is to say, the outer face of the spore is strongly areolate with large meshes, while the inner faces are nearly smooth or are at most only faintly and imperfectly areolate. When all of the supposedly distinctive characters of *Riccia Beyrichiana* and *R. Lescuriana* are compared, in a good series of specimens from various localities, one, I think, is forced to the conclusion that they do not offer a safe and satisfactory basis for specific distinctions. The name of the species then becomes *Riccia Beyrichiana* Hampe, a name that was published thirty one years earlier than *Riccia Lescuriana* Aust. The species evidently has a wide range in North America. Its most northeastern station, so far as now known, is at Northampton, Massachusetts, where it has

been found by Miss Annie Lorenz, who, by the way, states that at West Hartford, Connecticut, plants of this species persisted alive through the unusually severe winter of 1914 and that the species is apparently a perennial. Besides Massachusetts, Connecticut, New Jersey, and Georgia, the species has been found also in Illinois, Florida, Texas, Colorado, California, and Alberta (Brinkman). Under the name *Riccia Lescuriana* several European hepaticologists have attributed the species to Europe also, and as is the case with several other species in this genus, it seems impossible to separate some of the European material from the American. However, some of the non-ciliated European specimens that have been referred to *R. Lescuriana* seem to be more closely related to *Riccia glauca* or *R. bifurca* than to this species.

***Riccia McAllisteri* sp. nov.**

Thallus 2 or 3 times rather divergently forking, often forming densely gregarious more or less radiating masses, bright green when living, often whitish or yellowish-green with age or on drying, violet-purple or sometimes decolorate at margins and on sides, regularly reticulate above, 5–8 mm. long, the main segments oblong or oblong-obovate, 1.5–2.5 mm. wide, the terminal segments ovate, subquadrate, or somewhat obcordate, rounded-obtuse or subacute; median sulcus acute and sharply defined in anterior parts, becoming obscure in the posterior; ventral scales entire, reddish violet, claret-colored, or sometimes decolorate, imbricate, slightly exceeding the acute ascending margins, the extreme margin hyaline or violet and unistratose for a width of one or two cells; transverse sections of the thallus mostly 2–3 times broader than high, the ventral outlines rounded-convex or occasionally somewhat flattened; dorsal epidermis of two (or three) layers of cells, the cells of the primary stratum mostly mammiform-apiculate, soon collapsing and leaving rather inconspicuous, or sometimes cup-like vestiges, the cells of the secondary superficial stratum mostly 26–78 μ broad, these and underlying cells in very distinct and regular rows when viewed from above; monoicous; antheridial ostioles elevated 50–160 μ , often violet; capsules usually numerous, soon exposed, the spores lying conglobate in long masses at the bottom of a deep widely open pit or trough; spores at first violet or violet-brown, soon violet-black and opaque, 96–132 μ in maximum diameter, ellipsoid, ovoid, subspheric, or obscurely tetrahedral, wholly destitute of wing-margins, at first almost uniformly areolate over the whole surface, the areolae mostly 7–15 μ in diameter, soon obscure, and the spores finally appearing densely echinulate, the spinulae 5–11 μ long, truncate or obtuse, or occasionally subacute, sometimes cristate-furcate.

On moist ground near standing water in quarry-holes, Granite Mountain (about 70 miles northwest of Austin), Texas, *Dr. F. McAllister*, May, 1914. The technical type specimens were grown in the Propagating House of the New York Botanical Garden, whence they were collected and placed in the herbarium of that institution on December 8, 1914.

Plants that are doubtless to be referred to this species have been collected also at Glencoe, Missouri, by Dr. N. L. T. Nelson (in herb. A. W. Evans), though its spores are rather more obviously reticulate and less strikingly echinulate than those of the Texan type.

Riccia McAllisteri is related to *R. dictyospora* M. A. Howe, originally described from Athens, Georgia, yet appears to be specifically distinct, differing in the less elongate, less linear, less conspicuously marginate, more freely fork-

ing thallus, with less acute apices and rather more pronounced anterior sulcus, in the red-violet instead of black-purple scales, in the apparent absence of special "oil-body" cells, in the more elevated antheridial ostioles ($50-160\mu$ vs. $0-50\mu$), in the more apiculate and more persistent cells of the primary epidermis, in the usually larger (mostly $1\frac{1}{2}$ diameters) cells of the secondary epidermis, in the more regularly seriate arrangement of these and the subjacent cells when viewed from above, in the violet-black and soon opaque instead of brown and rather translucent spores; and the spores of *R. McAllisteri*, except in the younger stages, impress one as echinulate rather than areolate; short spines or papillae are finally developed in *R. dictyospora*, but they rarely reach a length of 5μ .

RICCIA VIOLACEA M. A. Howe, Ann. Missouri Bot. Gard. 2: 51. 1915.

Since the type of *Riccia violacea* was collected on Mona Island, between Porto Rico and Santo Domingo, in 1914, by Britton, Cowell and Hess, the species has been found by Dr. Britton and associates in two more Porto Rican localities, namely, Salinas de Guanica (Britton, Cowell, & Brown, 4919) and Cayo Muertos (Britton, Cowell, & Brown, 5089). And what appears to be the same thing from the Bay of Mariel, Province of Pinar del Rio, Cuba, where it was collected by N. L. Britton and F. S. Earle, Sept. 21, 1910 (no. 7594), has been discovered among the undetermined West Indian Hepaticae in the collections of the New York Botanical Garden. The species is, accordingly, now known from four stations, representing four West Indian Islands, if two small "Keys" are counted as islands. As the plants are very small (1.5-4.0 mm. long and 0.6-1.15 mm. wide) and easily overlooked, it now seems reasonable to suppose that critical field work might show the species to be widely distributed in the West Indian region. The new material permits the addition of certain characters that were unknown at the time of publishing the original description. Few well-developed archegonia and few spores have been seen, but it seems nearly certain that the species is dioicous; at least, numerous plants have been seen that appear to bear antheridia only, while most of the Cuban material appears to bear abortive or unfertilized archegonia only. The antheridial ostioles are elevated $20-150\mu$ and are often violet. The spores, seen sparingly in the Salinas de Guanica specimen after cultivation at the New York Botanical Garden, are soon fuscous and very opaque, $80-105\mu$ in maximum diameter, obscurely angled or flattened-sphaeroid, destitute of wing-margins, finely, irregularly, and almost uniformly areolate over the whole surface, the areolae $7-11\mu$ wide, soon very obscure and the spores appearing minutely and densely verruculose, the verruculae obtuse or truncate, $2-4\mu$ high.

In studies of the terrestrial *Ricciae*, it is of great advantage to have access to living material, and it is especially illuminating to have closely related species and forms growing side by side as has been done for two years or more in the Propagating House of the New York Botanical Garden. I am greatly indebted to readers of THE BRYOLOGIST for kindly supplying living material of various species and I would earnestly solicit a continuance of these favors during the coming season.

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